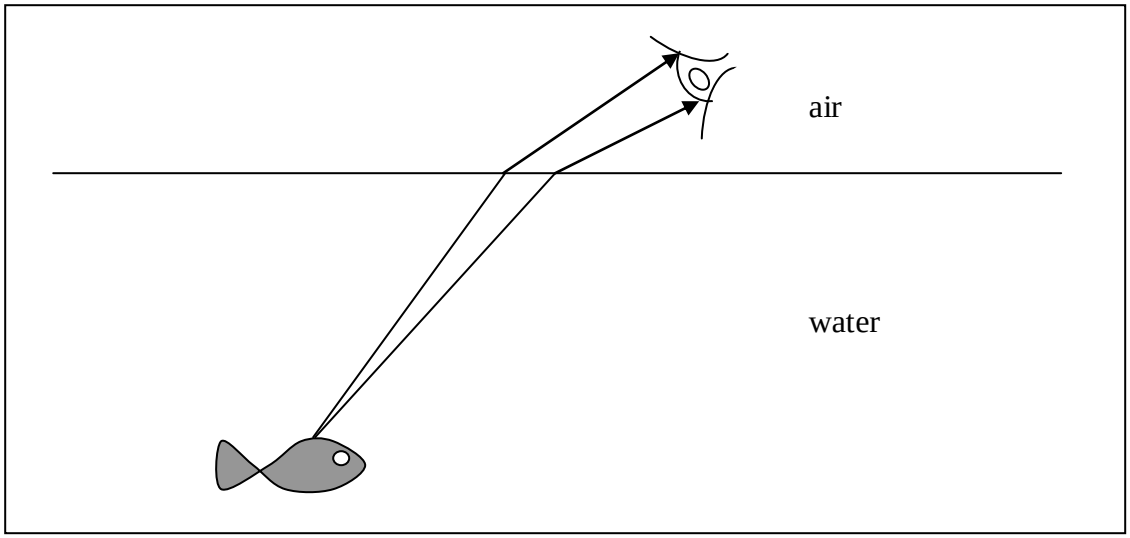
PHYSICS 2.3 **Name:**_____

WORKSHEET FOUR: LIGHT **REFRACTION AT PLANE BOUNDARIES**

1. When light passes from one medium to another its _____ does not change. What does change is its speed and this causes the _____ of the light to change as well.

2. When a ray of light passes from a denser medium to a less dense medium the ray is bent _____ the normal. When a ray of light passes from a less dense to a denser medium the ray is bent _____ the normal. **(away from, towards)**

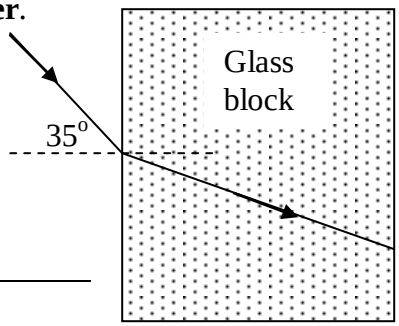
3. Complete the ray diagram to show why the fish appears closer to the surface than it really is.



The absolute refractive index for some substances are given below. Snell's law $\mathbf{n_1 \sin\theta_1 = n_2 \sin\theta_2}$

n(glass) = 1.52	**n(water) = 1.33**	**n(plastic) = 1.45**

4. (a) The glass block shown on the right is **immersed in water**. Complete the ray diagram to show what happens to the ray of light as it emerges from the glass block



(b) Use Snell's law to calculate the angle of refraction at the first interface given the angle of incidence is 35^o.

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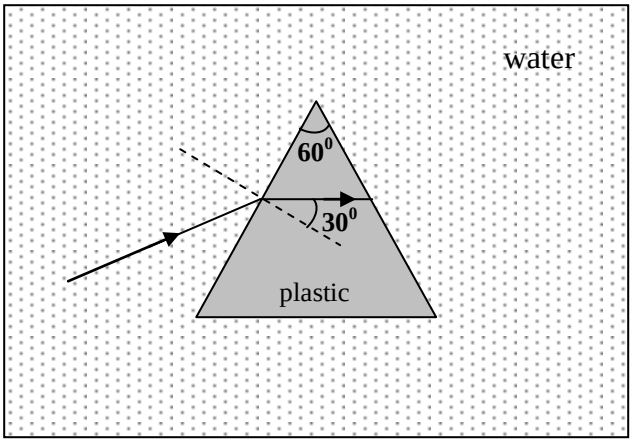
5. A 60^0 plastic prism is placed on the bottom of a tank and covered with water. A ray of light is shone through the water and is incident on one face of the prism as shown.



(a) Calculate the original angle of incidence of the ray of light on the prism.

(b) Calculate the angle of incidence of the ray of light on the second face of the prism.

(c) On the diagram sketch what happens to the ray of light as it emerges from the prism.

(d) Finally calculate the angle of refraction for the ray of light as it emerges from the second face of the prism into the water again.

6. A ray of light passes from water into plastic at 45^o and then into glass as shown in the diagram.

(a) Sketch the likely path of the ray considering the three refractive index values given.

(b) Calculate the incident angle of the ray on the plastic-glass interface.